Colorado
National Monument

National Park Service U.S.
Department of the Interior
Colorado National Monument
Fruita, Colorado

ROCK LAYERS OF THE MONUMENT

The rocks of Colorado National Monument record a fascinating story of mountain building, enormous amounts of erosion, and changing climates, as the continent of North America gradually moved northward toward its present position.

PRECAMBRIAN

The dark-colored rock at the bottom of the canyons is Precambrian in age, dated at 1.7 billion years old. These rocks were originally sedimentary rocks, but were changed into metamorphic rocks and partly melted into igneous rocks when the area that is now Colorado collided with ancient North America and became part of the continent. There is a huge gap in the geologic record at the contact of these rocks with the overlying red sedimentary rocks. The record of about 1.5 billion years of earth's history is missing! We know from surrounding areas that this region was uplifted into a major mountain range which, after hundreds of millions of years, was finally eroded low enough that sediments could be deposited where the mountains once stood.

TRIASSIC

The lowest and oldest layer of sedimentary rock is the **Chinle Formation**. Comprised chiefly of red stream and floodplain deposits, the Chinle Formation records a time when this area was close to the equator.

JURASSIC

As the continent slowly drifted northward, the climate changed and desert conditions prevailed. The towering cliffs of the wind-deposited (eolian) **Wingate Sandstone** preserve the remnants of sand dunes formed in that desert.

After the Wingate was deposited, rainfall became more abundant and shallow streams flowed across the area, depositing the **Kayenta Formation**. The irregular, wavy contact between the Kayenta and the overlying Entrada Sandstone represents another gap in the geologic record and is all that we have to tell us of a time when thousands of feet of wind-blown sand and other sediments were being deposited west of here, in Utah.

The **Entrada Sandstone** was also deposited by the wind but the climate was not as arid as before. It preserves sand dunes that migrated inland from the shores of an inland sea located in central Utah at that time.

After Entrada time, a succession of lake and stream deposits formed, beginning with the **Wanakah Formation** and followed by the **Morrison Formation**.

Here at Colorado National Monument, the lower part of the Morrison, called the *Tidwell Member*, was formed as a delta built out into a shallow lake. As the delta extended further and further into the lake, the main stream channels, represented by the *Salt Wash Member*, were able to extend across the area.

Stream and floodplain deposits and layers of volcanic ash that spewed out of volcanoes west of here comprise the uppermost part of the Morrison, the *Brushy Basin Member*.

Dinosaurs were abundant in the area while the Morrison sediments were being deposited and their bones have been found at several locations just outside of the monument. Undoubtedly they were present here as well.

CREATACEOUS

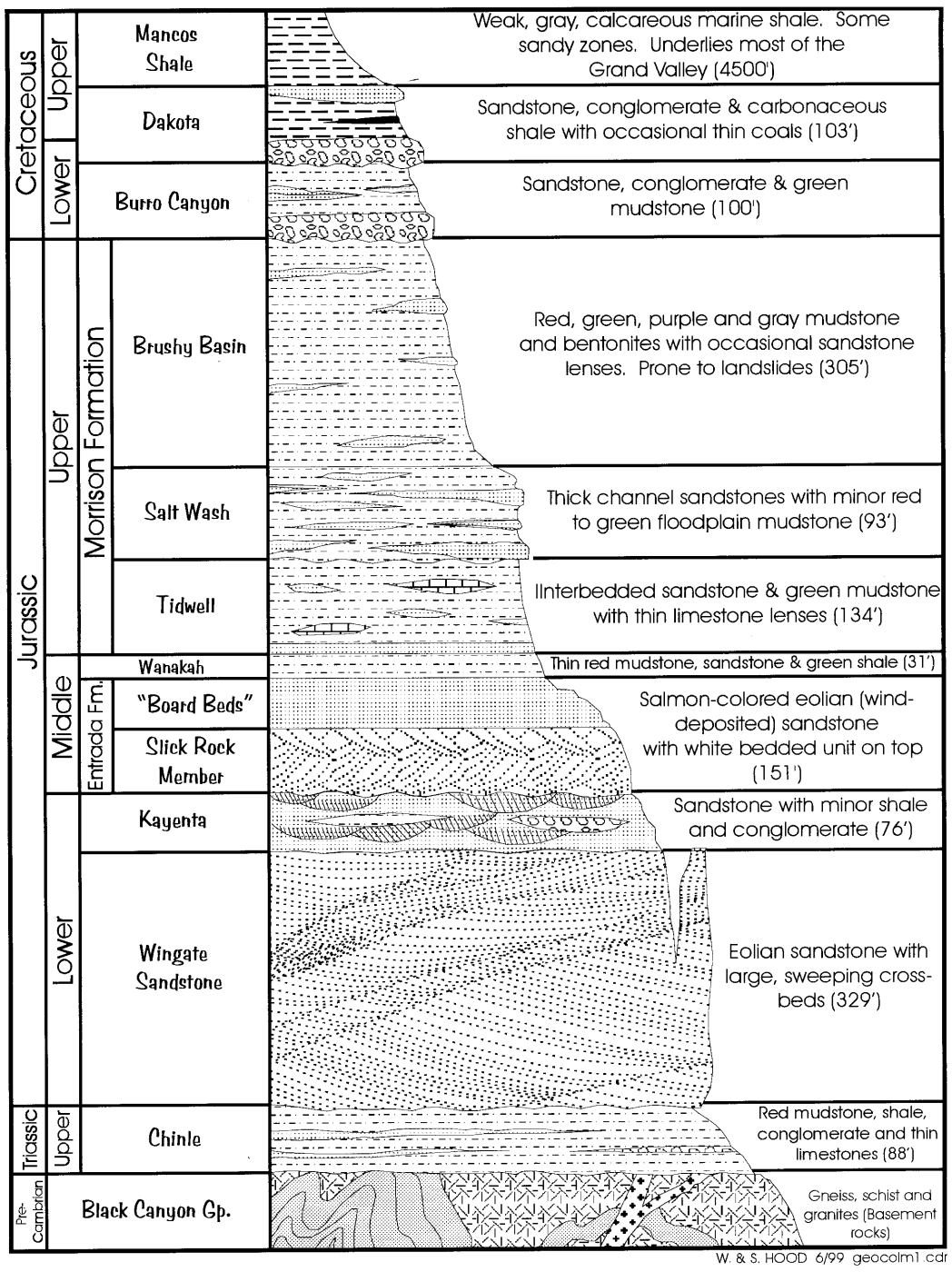
The youngest rock unit that occurs in the monument, the **Burro Canyon Formation**, is found only on Black Ridge. It too consists of stream and floodplain deposits and can be identified by the green shale that occurs within it. Petrified wood and dinosaur bones are found in this group of rocks also.

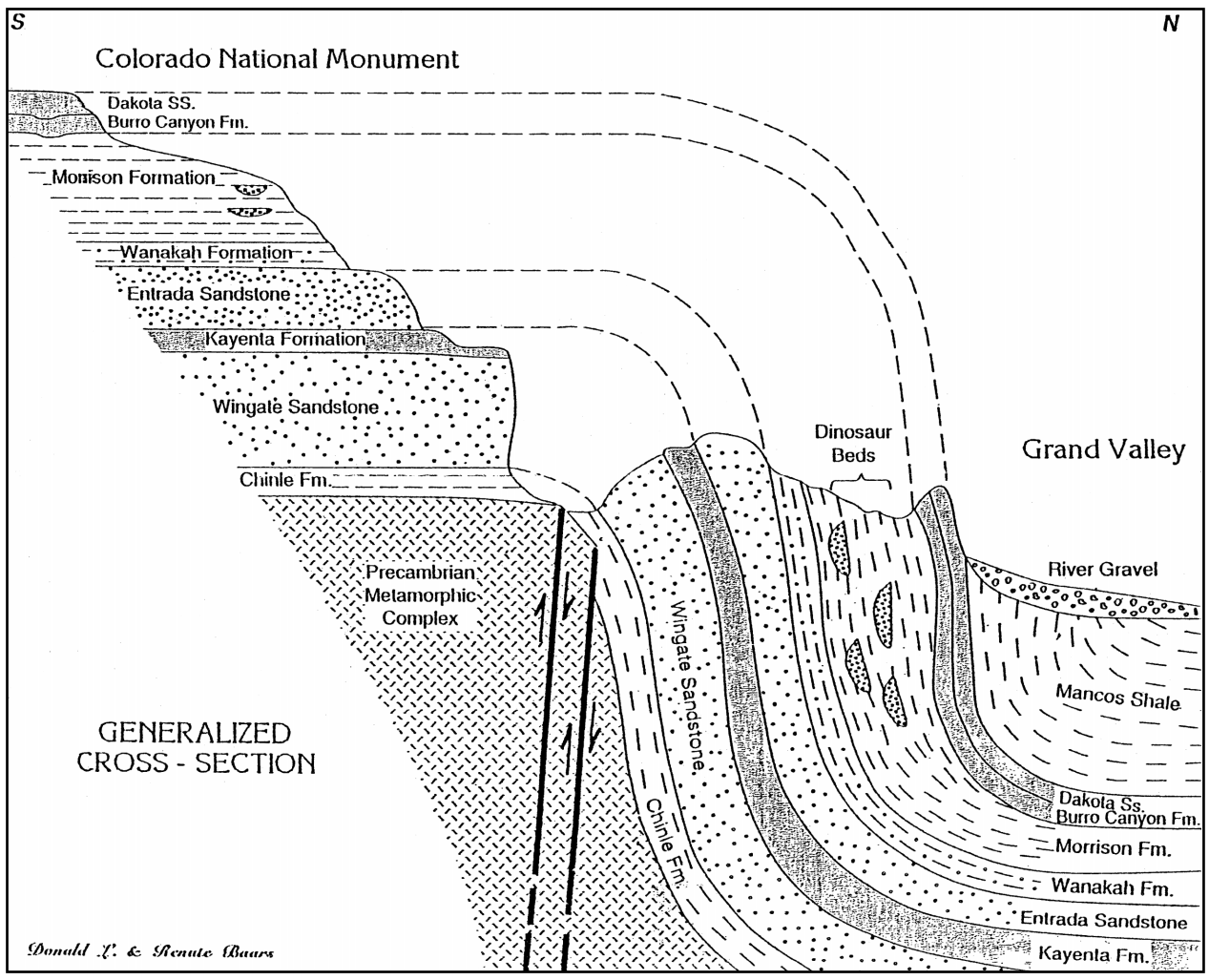
Our story would be incomplete if we failed to mention the next two rock layers. They do not now occur within the monument, although they certainly did in the past.

The **Dakota Formation** occurs on the very top of Black Ridge and along the south bank of the Colorado River. It preserves sediments deposited on a coastal plain, in lagoons, and on beaches as a great inland sea, extending from the Gulf of Mexico to the Arctic Ocean, invaded the interior of North America.

Muds eroding from mountains to the west accumulated on the sea floor, forming the massive deposit that we call the **Mancos Shale**. The Mancos Shale is over 4,000 feet (1219 m) thick in this area. It extends across the Grand Valley from the Colorado River to the Book Cliffs.

Those thousands of feet of Mancos Shale, plus even more rocks that are on top of the Mancos, once covered the area of Colorado National Monument—but another episode of mountain building elevated this area once again and started a new cycle of erosion. The relentless forces of erosion have stripped off those thousands of feet of sediment and have carved our magnificent canyons, exposing for us this wonderful story of earth's history.





EXPERIENCE YOUR AMERICA